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THE TFX DECISION: THE JOINT CANARD

Introduction:

In the early 1960's the United States needed replacement aircraft designs for both the Air Force and the Navy. The TFX (to become the F-111) was born and for some time struggled through a difficult development, testing and evaluation and combat periods before the Navy version of the aircraft was terminated and the total Air Force buy was considerably reduced. Why did a project with so much promise to provide a joint, reliable and cost-saving aircraft fail to achieve any of these three objectives? The answer lies in the understanding of the organizational paradigms and bureaucratic politics that influenced and guided the behavior of the competing organizations (Department of Defense, Contractor and Congress) that were ostensibly working as a team to produce a product. This paper will show how the TFX aircraft was seriously impeded from any measure of success by conflicting organizational goals and political actions.

History:

In 1959 the Air Force was attempting to define a follow-on aircraft that would replace the F-105 fighter-bomber, whose primary mission was deep nuclear interdiction. The nuclear delivery mission of the F-105 was threatened because it required a 10,500 foot runway, of which there were only seven in the European theater. What was required was a tactical nuclear bomber that could operate on unprepared fields and have improved operating characteristics above those of the F-105. The Air Forces' Tactical Air Command (TAC), under General F. F. Everest, formulated a specific set of requirements that specified a long unrefueled transit range (eliminating transatlantic refueling infrastructure), a relatively long supersonic, deck level dash capability (increasing enemy's targeting problem) and a capability to operate on unprepared grass stripes (increasing greatly the number of European operating sites).¹ Hence,

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the birth of the TFX.

The central problem was that TAC's requirements were aerodynamically contradictory.² To solve this dilemma the Air Force was provided technology from the National Aeronautical and Space Administration (NASA) that introduced the variable geometry wing. However, even with the introduction of the new wing technology, NASA and design agencies in the Air Force considered the long distance, deck level, supersonic dash capability impossible. Nonetheless, TAC insisted on proceeding.

At about the same time the Navy was designing a new subsonic, fleet protection and close ground support aircraft. By late 1960 the outgoing Eisenhower administration intervened and terminated both designs not wanting to commit the new administration to any major new weapons systems. The new administration of Kennedy and McNamara was intent on ending the duplication of weapon systems among the services. Furthermore, Kennedy wanted to revive the capability to deal with an enemy using conventional munitions unlike the Eisenhower reliance on the nuclear deference strategy, hence "Flexible Response." McNamara understanding the F-105's mission emphasis on massive retaliation and desiring to introduce an aircraft that fulfilled both service needs and restore the conventional option to the president resulted in the termination the F-105 program and the adoption of the Air Forces TFX.

In general, what we are striving for is one fighter to fill the needs of all the services -- a fighter which could operate from the large number of existing smaller airfields all over the world and yet fly without refueling across the ocean, thus greatly increasing its value for limited war purposes.³

The Defense Department adopted the TFX, because the design was not advertised or understood as a nuclear interdiction bomber and the Systems Analysis organization in the department was not employed to review the proposal. The main reason the TFX's performance requirements were not given such an analysis was that in 1961 the Secretary of Defense did not yet have an independent analytical staff. It was not until 1965 that the Systems Analysis Office had the charter and the manpower to review systematically the requirements aspects of proposed engineering development programs.⁴ The services were instructed to prepare requirements for a joint aircraft using the TFX design as the basis. The Navy

objected to the multi-service development citing the incompatibility of the TFX design with the close air support mission.⁵ The close air support mission was then separated from the design consideration (spawning the A-7) and the services resumed evaluation. The Navy continued to object and called for termination of the program. In September 1961, Secretary McNamara more forcibly entered the picture and by fiat added an additional criteria addendum to the TFX requirements to satisfy the Navy. He directed compromises to the design would be held to a minimum and that the Air Force would be in charge of the design and production effort.⁶

As a result, the plane would not possess the broad spectrum of capabilities anticipated for it. It would be a specialized interdiction aircraft, a true massive retaliation fighter plane, not a multi-purpose fighter for limited war. Moreover, with the weight and cost burdens implicit in the dominant Air Force requirements, the achievement of Navy objectives would be more difficult.⁷

In the subsequent source selection process, four rounds were required before a final selection was made. In each round the source selection committees and the service chiefs unanimously selected the Boeing Aircraft Corporation proposal over the General Dynamics Corporation proposal. In the final round in November 1962, Secretary McNamara selected the General Dynamics Corporation based on less risky technical terms, more realistic cost estimates and a larger common base of parts between the service's aircraft. In February 1963, in response to Secretary McNamara's decision, Senator McClellan (D, Arkansas) convened an investigation to evaluate any improprieties on the Defense Department's part in the selection process. These hearings failed to demonstrate any political influence on the selection process and by their inconclusive nature demonstrated that any decision on the contract award was a matter of judgment. The hearings did, however cast considerable public doubt on the wisdom of Secretary McNamara's decision.⁸ Secretary McNamara was subsequently required to provide a strong public defense of his decision, thus increasing his stakes in the program and creating a strong political alliance between Senator McClellan and the Navy. By this late stage, the debate could only be resolved by the success or failure of the program. Because of the hearings the normal compromising between the

contractor and the customer became very difficult due to the high visibility of the program.

In April 1965 the Department of Defense made a formal commitment to production of the F-111 by signing a letter of contract with General Dynamics before any flight test data had been accumulated on either version of the aircraft.⁹ Belatedly, in 1966 McNamara became fully aware of the nuclear interdiction emphasis of the aircraft, however it was too late to change the contract in any substantive way. Testing of the aircraft in 1965 and 1966 showed that the aircraft was underpowered, failed to meet specifications and required a major redesign of the engine, air intakes and avionics to make the aircraft acceptable. With aircraft coming off the assembly line General Dynamics then engaged in a redesign effort to correct problems. The resolution of these problems caused the aircraft to significantly increase in weight. In February 1968 Secretary McNamara resigned and in March 1968, Congress terminated funding for the Navy version, because no officials remained after McNamara left that were closely identified with the program. In mid 1968, the F-111 was introduced into combat in Southeast Asia and failed to perform adequately. The F-111 was being downed by unsophisticated enemy weapons, because the aircraft was significantly underpowered which eased the enemy's targeting capability.

Discussion of Organizational and Governmental Politics Paradigm:

If an (organization) performs an action of a certain type today, its organizational components must yesterday have been performing (or have had established routines for performing) an action only marginally different from today's action.¹⁰

The requirement and design actions of the Air Force and General Dynamics were predictable in the organizational model.

Given TAC's threatened environment by the advent of the intercontinental ballistic missile and the tactical vulnerability of the F-105 runway requirements, TAC's survival in the nuclear interdiction role required a new aircraft. The TFX as it was initially conceptualized embodied only an incremental change over the F-105 airframe. The TFX requirements were put together to justify the procurement of a new aircraft in an administration (Eisenhower) that endorsed the massive retaliation doctrine. TAC

acquired new technology that for the most part made the TFX requirements more realistic, and at the same time sophisticated enough to demonstrate a clear improvement of the TFX capabilities over the F-105. Hence, the TFX for all intents and purposes was a nuclear interdiction bomber that McNamara picked as the joint service aircraft. In the organizational model the decision maker in an effort to grasp the environment will conceptualize an environment that avoids uncertainties for which trade-offs are made (i.e. reduction in aircraft performance).¹¹ Once this hypothetical environment is established the decision maker will attempt to derail information that may discredit his conceptualization. Only when significant, unrefutable evidence is generated will the decision maker undertake a major restructuring of the perceived environment. In this case the TFX was acceptable as an all-purpose aircraft, because the decision makers not understanding the origination of the design, believed that the aggressive nature of the proposed requirements would result in the fall out of acceptable performance in the other mission areas.¹² The continual warnings, calculations and initial test results failed to cause a major restructuring of the conceptual environment. Not until significant flight data had accumulated did a reconfiguration of the aircraft requirements occur. Of course, it was too late to have any real impact on the basic design. The performance of the aircraft during the Vietnam War confirmed the test results. In the initial decision making process an understanding of the non-trivial trade-offs that would have been required to accomplish the central nuclear interdiction mission and the conventional interdiction mission, close air support and air superiority missions was avoided.¹³ In the decision to choose the TFX design McNamara understaffed the validity of the competing requirements. Also, the subordinate organizations on which he relied for assistance during the early program decisions conceived their task in ways that accommodated the Air Force requirement and avoided recognition of its disadvantages.¹⁴ Secretary McNamara by his acceptance of the TFX requirements for the multi-service mission unknowingly established a structure for development efforts that would filter out problems for multi-mission performance and would generate binding commitments before these problems could be known with confidence.¹⁵ Had the Systems Analysis office been fully staffed and functioning at that time, perhaps

the history of the TFX might have been different.¹⁶

If an (organization) performed an action, that action was the resultant of bargaining among individuals and groups within the government. The governmental politics model's explanatory power is achieved by displaying the game -- the action-channel, the positions, the players, their preferences, and the pulling and hauling -- that yielded, as a resultant, the action in question.¹⁷

The action in question here is the Senator McClellan investigation and subsequent public reaction to the decision to award the TFX contract to General Dynamics over the unanimous opinion of the source selection committee and the service chiefs.

The continual reconvening (four times) of the source selection committee to refine contractor proposals was in itself unusual, considering the committee in each case had recommended the selection of the Boeing proposal. Finally, overriding the recommendation of the committee and the service chiefs caused concern on the Hill. The object of the concern was Senator Henry M. Jackson from the state of Washington, also the state in which the Boeing Corporation was located. Senator Jackson requested the convening of an investigation from Senator J. J. McClellan, chairman of the Committee on Government Operations. The principle concern was how did the Secretary of Defense decide to award the TFX contract to General Dynamics when it appeared that Boeing had the better proposal based on the source selection committee's recommendation?¹⁸ Of real concern was the question of political interference on the Secretary's, Contractor's or other influential Department personnel's part in the decision. In the subsequent hearings a strong case was made for the Boeing proposal based on their early research on the variable geometry wing, repudiation of the Secretary's concern that the Boeing proposal was over optimistic, iterative nature of the selection process and the \$415 million higher cost of the General Dynamic product.¹⁹ When a substantial case for Boeing appeared close to being complete, Senator Stuart Symington from the state of Missouri [General Dynamics headquarters located in St. Louis, Missouri (Where you stand depends on where you sit.²⁰)] produced a line of questioning that shaped the decision more in the light of a judgment issue instead of a political issue. The remaining testimony

devolved into a finger pointing exercise with Secretary McNamara and the service secretaries lined up on one side and the service chiefs and the source selection committee lined up on the other side. Technical experts were evenly sprinkled between opposing sides. When no connection either political or financial could be made the investigation focused on McNamara's judgement.

...his organization's interests, specific programs to which he is committed, the welfare of his friends, and his personal interests. These overlapping interests constitute the stakes for which games are played. Stakes are an individual's interests defined by the issue at hand. In the light of these stakes, a player decides on his stand on the issue.²¹

As the result of these hearings, considerable public interest was directed at the Secretary's judgment. His forceful defense of the program and his judgment significantly increased his stakes in the TFX game with the public, Congress and specifically Senator McClellan. The hearings were discontinued when President Kennedy was assassinated. By that time the investigation was not producing any other significant revealing testimony that would further either side's case. The debate had degenerated into a comparison of numbers and a number of press leaks that made gave the investigation a gestapo ilk.²² The actual performance of the aircraft would have to be the ultimate decider in the case. With considerable stakes in the success of the aircraft, McNamara initiated weekly briefings or status reports, thus becoming considerably more personally involved. By the end of 1967 it was becoming apparent that the F-111 was not going to perform to the specifications that were required in the original 1959 Air Force requirements draft. Given his personal involvement in the program, he decided in November 1967 to leave the department. In February 1968 he retired and in March 1968 the Navy version of the plane was canceled. By the end of 1968 irrefutable evidenced had been compiled on the aircraft's poor performance both in tests and in combat in Southeast Asia. After more than a seven year break in the TFX Contract Investigation hearings, Senator McClellan reconvened the investigation. Virtually no one defended the program and the memory of Secretary McNamara took a considerable beating from many of the Senators that served on the original investigating committee.

The overriding fact about large organizations is that their size prevents any single central authority from making all important decisions or directing all important activities. Factored problems and fractionated power are two edges of the same sword. Factoring permits more specialized attention to particular facets of problems than would be possible...²³

After the contract was awarded, did the General Dynamics Corporation suffer from the same organizational issues that afflicted the Department of Defense in its preparation of the requirements?

In the assignment of the task to design an aircraft, the General Dynamics Corporation has a hierarchical decomposition structure. That is, complicated tasks are broken down into more simplified tasks as one proceeds lower down in the organizational structure and feedback in this model from the lower levels is fairly predictable or stable. Given the unstated mission profile of the TFX was that of a nuclear interdiction aircraft, then the broader capabilities that McNamara had hoped for, but not cited in the contractual sense were not achieved, because failure to achieve these broader capabilities was not perceived as design deficiencies within the development process. Once the basic capabilities were initially integrated into a design which was accomplished at the highest levels of the organization, then large adjustments and trade-offs in capabilities would have been disruptive to the process.

The design process is an extensively "negotiated" environment. Rather than treat the environment as exogenous and to be predicted, it tends to reduce the perception of variety and uncertainty by imposing stable simplifications on the design problem, simplifications that focus the attention of contractor and government officials alike.²⁴

Essentially, once the broad design of the aircraft was completed, lower levels in the organization pursued their design work and resulting feedback that indicated variance with design specifications were measured against the nuclear interdiction mission and not other missions. Hence, the aircraft design embraced the nuclear interdiction role, albeit poorly, while it attempted to accommodate other roles that were bought on the relatively limited scope of trade-offs that was done at the expense of the nuclear mission. The inflexible and narrowly focused design process delayed the full comprehension of the scope of the necessary trade-offs until it was too far too late to modify the early decision for the long range,

deck level, supersonic dash and its impact on the capabilities of the plane.²⁵

Conclusion:

In 1961 the requirement by the new leaders in the Department of Defense to end redundancy amongst the service programs and provide for conventional options resulted in some success: a bi-service requirement for the TFX came into being and was developed. Yet the functionaries involved in this process never really once demonstrated an awareness of the complicated long-term problems that this undertaking portended. They in their simplified view of the environment, miscalculated and misjudged a variety of strong organizational paradigms that for the most part impeded the progress of the aircraft. They failed to recognize the enormity of the trade-offs in mission capabilities necessary to achieve a multi-mission aircraft inside the framework of the original TFX requirements. The massive nature of the implicit redesign effort was "off the scope" of the organizationally constrained actors.

The damaging hearings in 1963 forced McNamara to come to the rescue of the program and at the same time caused him to significantly raise his stakes in the game. As the game played out, McNamara realized that his increased liability in the TFX program would catchup with him and he decided to leave the government. The Navy canceled its version of the TFX and through a variety of substantial and expensive modifications to the F-111 the Air Force now has a capable bomber.

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4. Alain C. Enthoven and K. Wayne Smith, How Much is Enough? Shaping the Defense Program, 1961-1969. (New York: Harper and Row, 1971) 262-263.
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6. Coulam 52
7. Coulam 55
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10. Graham T. Allison Essence of Decision Explaining the Cuban Missile Crisis (New York: Harper, Collins 1971) 87
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16. Enthoven, Smith 262, 263
17. Allison 173
18. U.S. Senate, Committee on Government Operations, TFX Contract Investigation, 26 February 1963 p. 4.
19. Senate, TFX Contract Investigation, 374, 428.
20. Allison 176
21. Allison 167, 168
22. Senate, TFX Contract Investigation, 437
23. Allison 80
24. Coulam 151
25. Coulam 153